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A REMARKABLE meteor, or meteoric shower, passed over this State at 5.30 P.M., Friday, May 2. In spite of the brightness of the sun, shining at the time in a nearly cloudless sky, the light of the meteor was very noticeable. Its great size, powerful illumination, discharge of sparks, comet-like tail three to five degrees in length, and the great train of smoke which marked its course for a full ten minutes after its passage, made a strong and lasting impression on the minds of all who saw it. Unfortunately the clamor over an exciting game of ball prevented the many members of the college who saw it from making as careful observations as they would otherwise have done: so it was impossible to tell whether its passage was accompanied by sound or not, although farmers near here report a faint hissing noise. It appeared to enter the atmosphere about twenty to thirty degrees south of the zenith, and, descending at an angle of about fifty to sixty degrees, passed below the horizon north-north-west of this place. By telegraphing, one small meteorite weighing one-fifth of a pound, and several fragments from a 70-pound one, were secured, and analyses and microscopic sections at once made. They contain a large amount of metal for the "stone" class of meteorites.

Following is the analysis of the matrix of the 70-pound meteorite: silica, 47.03; iron oxide, 29.43; oxide aluminium, 2.94; lime, 17.58; magnesia, 2.96; total, 99.94.

The specific gravity is 2.63. The shower covered an area at least two and a half miles long by one wide, near Forest City, Io. There the meteorites are said to have fallen in great numbers; and already many have been found, varying from a few ounces to sixty or seventy pounds in weight.

It seems worthy of mention, that, in accordance with theories entertained here, a 100-pound aerolite has just been found in Kosuth County, some thirty or forty miles farther north. These meteorites all have the characteristic burned, blackened surfaces. Within they are light gray, interspersed with innumerable irregular spots of iron. The many exaggerated and excited reports make it difficult to get at facts: so it seems best for the present to make only a preliminary statement and analysis, until we can make a full and accurate report on this last and highly interesting Iowa meteor.

JOSEPH TORREY, JR.
ERWIN H. BARBOUR.

Iowa College, Grinnell, May 9.

BOOK-REVIEWS.

Die Entstehung der Arten durch räumliche Sonderung. Von MORITZ WAGNER. Basel, 1889. 8°.

MORITZ WAGNER, traveller and journalist, was born Oct. 3, 1813, at Bayreuth, and died at Munich, May 30, 1887, by his own hand. He regarded the principal achievement of his life to have been the enunciation of his theory of the origin of species by geographical separation. He wished, toward the close of his life, to publish a comprehensive work on this theory; but an accident having crippled him, and illness interfering, he never carried out his purpose. His nephew and namesake, Dr. Moritz Wagner, 2d, of Baden by Zurich, has collected most of the elder Moritz' essays in a single bulky volume, to which he has added his own "rider" in the shape of a speculative dissertation on the origin of life and the evolution of species, and prefixed a memoir by Von Scherzer. In judging of Wagner, we have to remember always that journalism was his profession and means of support, and that natural history, though his favorite study, always occupied a second place until the latter part of his life. His father was a school-teacher in poor circumstances, and with six children. Young Moritz showed his master passion by keeping animals and making large collections. When only fifteen years, he contributed editorial articles to some of the local newspapers of Augsburg, where his family were then living. In 1836, when twenty-three years old, he undertook his first journey, going to northern Africa, where he secured an appointment to accompany the French Army in Algiers. The necessary preliminary outlay was covered by advances made by his brothers and friends, and all the expenses were finally met by the sale of his collections and the earnings of

his pen. He sent frequent letters to the *Augsburger Allgemeine Zeitung*, then as now a leading journal. These letters were eminently successful; and from this time on, Wagner undertook one journey after another, earning the means by his writing. After his first journey he felt the lack of scientific training, and accordingly spent two years at Göttingen, studying geology principally, maintaining all the while his newspaper activity. His next enterprise was a journey to the Caucasus, Black Sea, and Persia, and later followed his principal journey. In company with Von Scherzer, he came to New York, May, 1852, travelled over the United States for a year and in Central America for two years, much of the time collecting archæological material for the British Museum. His reputation as a writer and traveller attracted the favor of the King of Bavaria, who gave him liberal aid for another long exploring journey to Central and South America.

Except as regards the Australian and polar regions, Wagner possessed an intimate acquaintance with all the principal faunas and floras of the world, and the central interest of all his work lies in the study of the geographical distribution of species. The phenomenon which attracted his attention most was that of closely allied species occupying separated areas of distribution. Thus among rattlesnakes, all of which are American, *Crotalus durissus* belongs to the Atlantic fauna; *C. rhombifer*, to Central America; *C. miliarius*, to the south-western United States; *C. tergeminus*, to the Rocky Mountains; *C. horridus*, to Brazil; and so on. Similar instances recur in all classes of plants and animals. The most striking examples are furnished by the humming-birds, some of which are widely distributed, like our own *Trochilus colubris*, which ranges from Mexico to Labrador, while others are exceedingly restricted, there being a number of species which are limited not merely to a single mountain, but also to certain altitudes. There is, says Gould, a new species about every thousand feet. The genus *Orestrochilus* occurs only at great heights, 10,000 feet and more, and is represented by distinct species on Aconcagua, Cotopaxi, Chimborazo, Cayambe, and other mountains. *Orestrochilus chimborazo* lives up to 16,000 feet, and hunts for flies above the snow limit. Wagner's writings give these examples and many others. This class of facts acquired an immense importance in his mind, and led him to think that species always are distinguished by separate areas of distribution; and as a corollary from this opinion he maintained that species arise by a common stock, having two or more areas of distribution, which become distinct or separated by some physical barrier, and that the separation causes the differentiation of the original single species into a corresponding number of new species.

The first formal announcement of his theory was made by Wagner in a brochure published at Leipzig in 1868, and entitled "Die Darwin'sche Theorie und das Migrationsgesetz der Organismen." He defended the theory in 1870 in a pamphlet on the influence of geographical isolation, and also in three articles published in the periodical *Kosmos* for 1880. All of these, and others bearing upon the subject, are included in the volume before us. Wagner's essays show the journalist. They are all discursive and pleasant, it is easy to read along in them, but there is a complete absence of that formidable marshalling of facts and unconquerable logic which is the stamp of Darwin's work. Wagner nowhere compiles all the facts of geographical isolation, nor enumerates those which conflict with his theory, either to acknowledge their force or explain them away. He leaves us, moreover, completely in the dark as to how geographical isolation causes new species. All that he has done is to make the generalization that in a large class of cases closely allied species have distinct areas of distribution, — a fact which indicates that separation is a favorable condition for the development of species, but does not prove it to be a cause. Moreover, the fact that often closely allied species have similar or even identical areas of distribution shows that species arise from other influences than mere separation. Nor can Wagner's theory explain the phenomena of mimicry. These objections have all been urged against Wagner's theory of the origin of species,¹ and their force has justly prevented the general acceptance of the theory: at the same time naturalists have recognized the value of the array of facts presented by Wagner.

¹ See especially August Weismann's criticisms, published in 1872.

The appendix by the nephew, the younger Moritz, is one of those odd pieces of speculative effort to solve the most abstruse problems of science which are only possible when the range of knowledge is very limited in the speculator's mind. He puts forward the hypothesis that life arose while the earth was a core of liquid fire surrounded by gases; an electric spark caused an explosion in the gaseous envelope, which produced organic compounds; the compound at once existed in the form of separate living particles; the circulation in the atmosphere caused the particles to enter into vortices, and when the centrifugal motion predominated pseudopodia were thrown out, when the centripetal force got the control a nucleus was generated; and there have been nuclei ever since. It will be remembered that when the bean split itself with laughing, it was sewed up by the tailor, and all beans have had black seams ever since; but who can tell us how the nucleus and the bean got hold of such enduring heredity of acquired characteristics? In the following chapters of the appendix there is more regard paid to the conceivable: yet throughout, the editor is seen not to be grown to his work; for example, in discussing the planorbis shells at Steinheim, he makes no mention of Professor Hyatt's work.

The editor has fulfilled a graceful and acceptable labor in gathering together his uncle's papers, and we hope that as now collected they may secure renewed attention, not to Moritz Wagner's migration theory, but to the peculiar facts of geographical distribution which led to the theory, and have an important bearing on the problem of natural selection.

CHARLES S. MINOT.

Electric Transmission of Energy, and its Transformation, Subdivision, and Distribution. By GISEBERT KAPP. New York, Van Nostrand. 12°. \$3.

THIS is the second edition of a work which first appeared some three or four years ago, a notice of it being printed in these columns at the time. It belongs to the well-known "Specialists' Series," intended mainly for the use of students and electrical engineers; though to all persons interested in the special field it occupies it will prove useful and valuable, especially so to students of what may be termed "the comparative anatomy of dynamos and motors."

We are glad to see that the changes necessitated in such a work by the progress of electrical science during the past few years have been made, "bringing the book up to date," as the author says. Among the changes made, it may be mentioned that the author's method for the predetermination of the characteristics of dynamos has been introduced, thereby making the theoretical part of the work more complete. Though this now well-known method had been made use of by Mr. Kapp before the appearance of the first edition of the work, he had not sufficient confidence in its general applicability to give it a place in

the book. Since that time, however, the results of the method, as applied by other electrical engineers, have been so satisfactory that it has been deemed worthy of a place in the volume, and justly so.

In the portion of the volume devoted to practical electricians many noticeable alterations have been made, due mainly to recent progress in the construction of dynamos. Obsolete machines are no longer mentioned, and descriptions of new types, or new modifications of previous types, are introduced, data comprising the leading features of such machines and the results of actual tests being given whenever practicable. This is done because the author believes that precise information regarding a few characteristic features in the design of successful dynamos are of much greater value to the electrician than more extended general descriptions.

The portion of the work devoted to electric railways has received but slight addition, notwithstanding the great progress made in that department during the past few years. The reason for this seeming omission is obvious. To do the subject justice would require a volume larger than that in which a single chapter only can be spared it without infringing on other portions of the field, all of which are equally important in a general survey such as this aims to be.

The transmission of energy by alternating currents is not touched upon, that phase of electrical development being still in the experimental stage (except for lighting); though Mr. Kapp considers it possible, that, "for the transmission of very large powers over very long distances, the alternating current may eventually prove more convenient than the continuous current."

The book is an important one, covering a field through which Progress seems to travel in seven-league boots; and the brief interval between the appearance of the two editions seems to be a very close measure of the time between the experimental stage and the complete commercial success of long-distance transmission of electrical energy.

The Economic Basis of Protection. By SIMON N. PATTEN. Philadelphia, Lippincott. 12°. \$1.

THIS book is a plea for the high tariff; but it is one of the least efficient of such pleas that we have met with. It is a mass of confusion, the author often getting bewildered with his own argument,—a fact that will not surprise those who have read his other works. He uses the deductive method exclusively, and is not at all particular about his premises. Indeed, he expressly says that "the theory of a subject must always be developed previous to any intelligent study of the facts" (p. 9); and he has certainly applied this rule faithfully in the present case. We cannot undertake to give an analysis of his arguments here; but one of his chief points is the endeavor to show that free trade fos-

Publications received at Editor's Office,
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- AFRICA, Pictorial. New York and Chicago, Fleming H. Revell. 396 p. \$2.50.
CARNOT, N.-L.-S. Reflections on the Motive Power of Heat and on Machines fitted to Develop that Power. Ed. by R. H. Thurston. New York, Wiley. 260 p. 12°. \$2.
CHAMBERS, G. F. A Handbook of Descriptive and Practical Astronomy. II. Instruments and Practical Astronomy. 4th ed. Oxford, Clarendon Pr. 8°. (New York, Macmillan, \$5.25.)
GEOLOGISK kart over De skandinaviske lande og Finland. Udgivet af Hans Reusch. New York, N. D. C. Hodges, 47 Lafayette Place. 40 cents.
GREEN, W. S. Among the Selkirk Glaciers. London and New York, Macmillan & Co. 251 p. 12°. \$2.25.
PATTEN, S. The Economic Basis of Protection. Philadelphia, Lippincott. 144 p. 12°. \$1.
TUTHILL, Mrs. L. C. The True and the Beautiful in Nature, Art, Morals, and Religion. Selected from the works of John Ruskin, with a notice of the author. 2 vols. New York, Wiley. 638 p. 12°. \$2.
WHITING, H. A Short Course of Experiments in Physical Measurement. Part I. Density, Heat, Light and Sound. Cambridge, Mass., John Wilson & Son. 278 p. 8°.

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